December 14, 2007

Mr. Jay Bestgen
MoDOT Design Division
1320 Creek Trail Drive
Jefferson City, Missouri 65109

Re: Practical Design 2008 Awards for Excellence – Route 249/171 Interchange

Dear Mr. Bestgen:

The project we are submitting is **J7U0436I / J7U0436K** (let in combination), the **Route 249/171 Interchange** located in Jasper County, Missouri. This project was rated as MoDOT District 7's top priority for providing connectivity from Route 171 to Zora Street. This project showcases cost savings realized through Practical Design and a program developed to minimize cost and safety risks associated with construction above abandoned mines.

The Route 249/171 Interchange is located within one of Missouri's most complex geological sites, the former Tri-State Mining District. The Tri-State mining district, so named for its location at the junction of Missouri, Kansas and Oklahoma, was formerly one of the largest lead and zinc producing districts in the world. Mining began in the project area in the 1850's with excavation of the shallow "upper ground" minerals. Around 1900, advances in mining along with capitalization brought mechanization, milling, hoisting, explosives and pumps with the ability to dewater the mines and lower the groundwater. Existing mine shafts were deepened and horizontal drifts began in the lower more competent rock layers. Mining references suggest a few of the deep mined openings may have been as large as 18 to 21 meters. The sheet ground deposits were mined by irregular pattern room and pillar methods. Historical mining records suggest supporting pillars were removed and the open mines were filled with groundwater during World War II when mining operations ceased.

Recognizing the complexity of the project site, MoDOT and the University of Missouri-Rolla performed an extensive geotechnical investigation in the early 1990's. The investigation included traditional borings, ground penetrating radar, evaluation of historical mining records, and investigation of the site to determine location of open mine shafts and underground openings. The design of the interchange was completed by 2001. The project was later placed on hold due to budget constraints.

In 2003, as a result of additional investigation MoDOT discovered several of the proposed bridge foundations were located directly above or near possible mine shafts. This marked the beginning of additional geotechnical investigation which led to the re-evaluation of the project design. The geotechnical investigation program included the evaluation of existing data obtained by MoDOT and UMR, additional deep borings utilizing specialized coring and down-hole camera methods, groundwater testing, rock mechanics analysis of the mine roof beams, and detailed evaluation of site geology and geotechnical foundation conditions. The results of these additional investigations provided the basis for the Practical Design study, development of contract documents, Geotechnical Baseline Report, contractor procurement process, and construction monitoring program which provided the most cost effective and practical solution for construction.

Faced with an aggressive design and construction schedule, MoDOT and HNTB collaborated on an approach to delivering the project that meets the purpose and need, capitalized on the use of existing data, maximized the potential for this EPA Superfund site, effectively managed risk, and exceeded the objectives of Practical Design. Design and contract documents were completed by October of 2005.

Below is a brief summary of how this project compares to the Practical Design 2008 rating guidelines. We are excited to submit this project for consideration in the 2008 Awards for Excellence.

A. Scope Comparison

Before practical design, the bridges would have been built long enough to span Mine Branch Creek, the roadways and bridge widths would have been substantially wider, and the earthen embankment quantities would have been greater. The project as-designed, saves cost by maximizing the use of earthen embankments, box culverts, and retaining walls to minimize bridge lengths. Embankment quantities were reduced by utilizing guardrail to allow for steeper side slopes. Roadway and bridge widths were reduced. The total number of bridge substructure units was reduced to minimize the specter of costly over-runs due to unforeseen conditions (mine features) encountered during construction.

B. Purpose and Need

This project meets the project's purpose and need by expanding the existing transportation system to connect I-44 and U.S. 71 to Route 171, making a blighted Superfund area into a productive development corridor for the City of Joplin and surrounding communities. In addition to meeting the purpose and need, the as-designed project managed risk associated with construction over abandoned mines as well as the potential of large cost over-runs, and provided confidence that safety to the traveling public is maintained. Given the existing conditions of the project site, this project represents the most appropriate, efficient, effective and safe design.

C. Cost Savings

The cost savings realized for reduced bridge length and width is approximately $2,715,000. The total cost savings of this project can not be fully documented because the original design, as developed in 2001, did not accommodate the geotechnical complexities revealed upon further investigation. The project changes were made between STIP cycles. The final STIP budget included all of the savings developed in the Practical Design study. The following costs saving measures were incorporated during the planning and design phases of the project:

- EPA compensated MoDOT for utilizing chat that was located outside the ROW.
- Minimized bridge lengths, widths and substructure units.
- Minimized structural steel quantities utilizing HPS Grade 70W steel.
- Minimized roadway and shoulder widths.
- Utilized steeper side slopes to minimize embankment quantities and culvert lengths.

The cost of change orders due to unforeseen conditions, excessive grout takes, and micropile lengths were limited to 4% of the contractor's original bid. This is extraordinary considering the geotechnical complexities of the site. Limiting construction cost over-runs was made possible due to the following:

- Pre-qualified drilling and grouting contractors.
- Utilized Geotechnical Baseline Report as the basis for all change orders arising from unforeseen geotechnical, drilling and grouting conditions.
- Job Special Provisions that limited the amount paid for excessive grout takes.
- Construction monitoring program provided real-time engineering evaluation and design modifications for conditions observed in the field.

Total cost savings for the project greater than $2,715,000.

Total cost savings realized mitigating risk of mine subsidence over the service life of the interchange may never be fully understood.

D. Roadway User Expectations

Traffic was maintained on the existing routes, providing zero delays during construction.

The commitment to complete the project by March 2008 was made prior to fully understanding the geotechnical conditions and risks of the project site. The acceleration of the investigation program, preliminary and final design allowed sufficient time to pre-qualify contractors for specialty work. The successful partnership of MoDOT, HNTB and the contractor minimized construction delays and disputes due to unforeseen conditions. The accelerated investigation program, design and partnership have kept this project on schedule as promised with a March 2008 completion date.

MoDOT PROJECTS
2008 APPLICATION FORM
(required for each entry)

Job No. J7U0436I & J7U0436K (Let in Combination) **Route** 249 **County** Jasper

STIP Description (Scoping or Construction, state which STIP)

J7U0436I (2006 STIP) – Grading and bridges for 2 lanes from Rte. 171 to Zora Street. Includes interchange at Rte. 171. Project relates to 7U0436K. Amendment 3 accelerated project. J7U0436K (2006 STIP) – Grading and bridges for specialized bridge foundation work and sub-surface ground improvements from Rte. 171 to Zora Street. Includes interchange at Rte. 171. Project relates to 7U0436I.

Is the submittal for the entire project or just a portion of the project? Please explain:

This submittal is for the entire project with special emphasis on the work related to ground treatments and foundation construction.

Project Manager (could have both) **MoDOT** Beth Schaller **Consultant** Chris Peters

Key core team members as approved by the MoDOT PM (may include consultants) (limit of 9)

Joe Aldridge	Larry Whiteside	Wayne Duryee
Craig Switzer	Alan Miller	John Szturo
Joyce Foster	Mike Fritz	

Project Contacts: District Beth Schaller **Consultant** Chris Peters

Project Budget:

Conceptual budget $ N/A **Initial STIP Budget** $ 31, 038,000

Final STIP budget $ 30,170,000 **Award amount** $ 29,168,000

Comment: The project as originally designed did not encompass the scope of work necessary to perform ground treatments required reducing risk of ground collapse under bridge foundations and roadway embankments; therefore the conceptual and initial STIP budget information is not applicable. The value shown for the initial STIP budget was calculated by estimating the cost of the original project plus the ground improvement/treatments determined necessary after completing the geotechnical investigation and risk assessment. See the project description information for more information.

Value Engineering study during design? yes **X** no ☐ (if yes) **Project Stage** Preliminary

Total VE savings implemented $ 2,715,000 **VE Contact Person** Beth Schaller & Joyce Foster

Construction-stage VE (VECP)? yes **X** no ☐ (if yes) **Explain:** HNTB performed construction monitoring for Job No. J7U0436K (ground improvement/treatment and foundation construction). Grouting operations required for mine shaft closures and ground improvement /treatments were closely managed in real-time to adapt to actual encountered ground conditions, minimizing contractor delays and minimizing grout takes. Micro-pile lengths were modified in real-time based on actual ground conditions encountered.

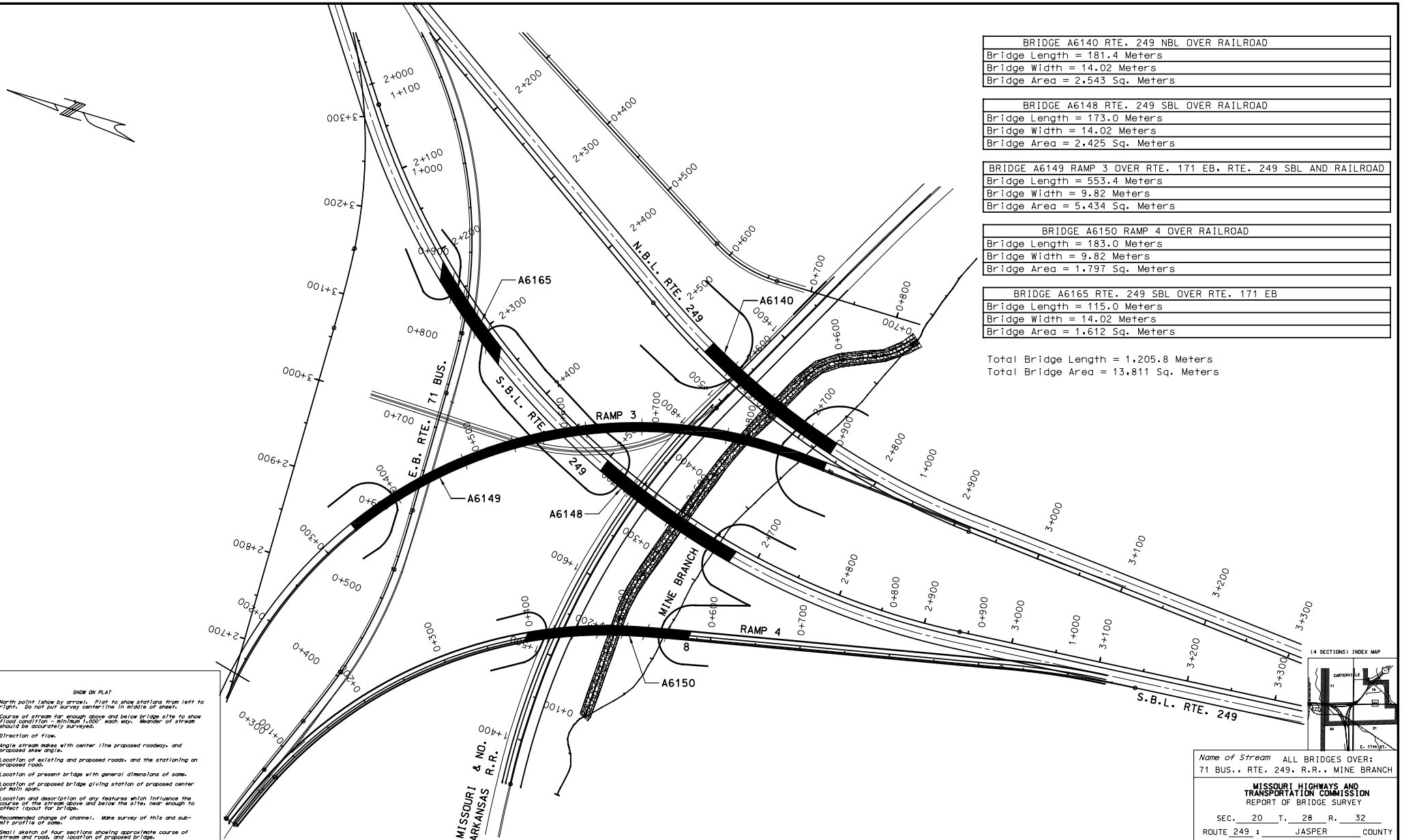
Total VECP savings $ Unknown **VECP Contact Person** Mike Middleton

Comments: The total amount of grout and micropile length necessary to complete this project was estimated based on the subsurface information obtained during the geotechnical investigation phases. The complex geology of the heavily mined site presented the potential for massive grout takes and micropile lengths much greater than anticipated. Construction monitoring, on-site engineering evaluation, and the Geotechnical Baseline Report provided unquantifiable cost savings. See the project description information for more information.

What would make this entry stand out from the rest of the entries when considering MoDOT's practical design philosophy? (In layman's terms - 100 words or fewer) The total bridge length and area was reduced by 429-meters and 6,244-sq. meters, respectively. The number of bridge foundations was reduced by 50% minimizing the risk of encountering unknown mined conditions and additional construction costs. Roadway widths were minimized. Earthwork quantities were minimized by decreasing the side slopes of the roadway embankments. The Geotechnical Baseline Report provided the basis for all change orders. The special provisions limited the amount to be paid for grout over-runs. Innovative foundation systems and construction monitoring techniques provided the most practical and cost effective solution for construction on the most complex geological site in Missouri.

Send entries to: MoDOT Design Division, ATTN: Jay Bestgen
1320 Creek Trail Dr., Jefferson City, Missouri 65109

ALL ENTRIES MUST BE RECEIVED NO LATER THAN CLOSE OF BUSINESS ON DECEMBER 15, 2007.



BRIDGE A6140 RTE. 249 NBL OVER RAILROAD
Bridge Length = 181.4 Meters
Bridge Width = 14.02 Meters
Bridge Area = 2,543 Sq. Meters

BRIDGE A6148 RTE. 249 SBL OVER RAILROAD
Bridge Length = 173.0 Meters
Bridge Width = 14.02 Meters
Bridge Area = 2,425 Sq. Meters

BRIDGE A6149 RAMP 3 OVER RTE. 171 EB, RTE. 249 SBL AND RAILROAD
Bridge Length = 553.4 Meters
Bridge Width = 9.82 Meters
Bridge Area = 5,434 Sq. Meters

BRIDGE A6150 RAMP 4 OVER RAILROAD
Bridge Length = 183.0 Meters
Bridge Width = 9.82 Meters
Bridge Area = 1,797 Sq. Meters

BRIDGE A6165 RTE. 249 SBL OVER RTE. 171 EB
Bridge Length = 115.0 Meters
Bridge Width = 14.02 Meters
Bridge Area = 1,612 Sq. Meters

Total Bridge Length = 1,205.8 Meters
Total Bridge Area = 13,811 Sq. Meters

SHOW ON PLAT

A. North point (show by arrow). Plot to show stations from left to right. Do not put survey centerline in middle of sheet.
B. Course of stream far enough above and below bridge site to show flood condition - minimum 1,000' each way. Meander of stream should be accurately surveyed.
C. Direction of flow.
D. Angle stream makes with center line proposed roadway, and proposed skew angle.
E. Location of existing and proposed roads, and the stationing on proposed road.
F. Location of present bridge with general dimensions of same.
G. Location of proposed bridge giving station of proposed center of main span.
H. Location and description of any features which influence the course of the stream above and below the site, near enough to affect layout for bridge.
I. Recommended change of channel. Make survey of this and submit profile of same.
J. Small sketch of four sections showing approximate course of stream and road, and location of proposed bridge.
K. Location, elevation and description of two permanent bench marks.
L. Fences, buildings, etc. also reference points and ties on each side of stream.
M. Name of stream State whether it is a river, creek, drainage ditch, rocky or dry run, etc.
N. Location of valley section (see "b" contracted profile).

Original Bridge Layout - Before Practical Design

(4 SECTIONS) INDEX MAP

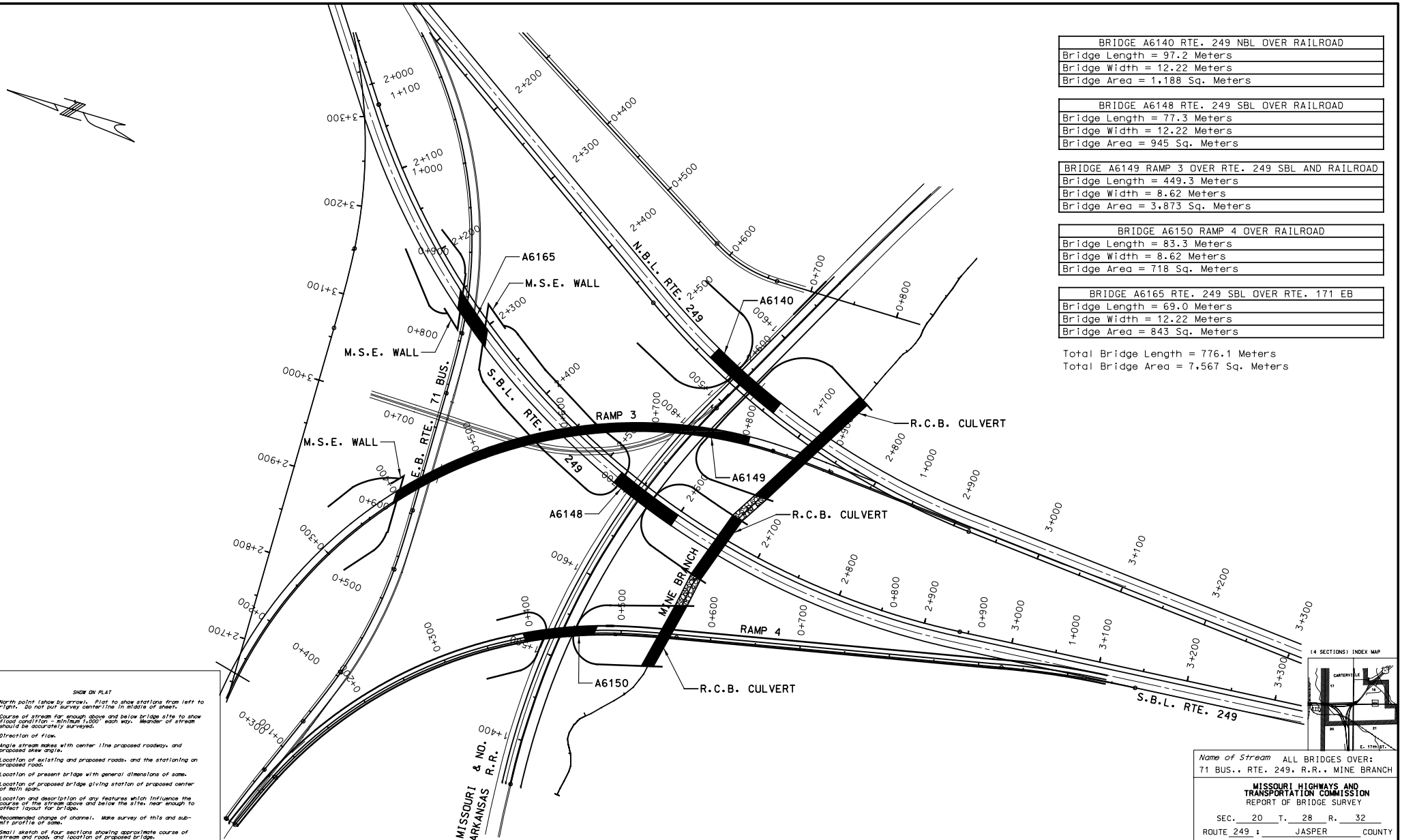
Name of Stream ALL BRIDGES OVER:
71 BUS., RTE. 249, R.R., MINE BRANCH

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
REPORT OF BRIDGE SURVEY

SEC. 20 T. 28 R. 32
ROUTE 249 ; JASPER COUNTY
SURVEY MADE BY R. PRESLEY 98
PREPARED BY JERRY BRADLEY / HNTB
Project Manager
CHECKED BY RICHARD WALTER / HNTB
Transportation Project Manager
PROJ. NO. STA.
JOB NO. J7U0436I BRIDGE NO.

$FILE$ $TIME$ $DATE$

REV. 2-26-99



BRIDGE A6140 RTE. 249 NBL OVER RAILROAD
Bridge Length = 97.2 Meters
Bridge Width = 12.22 Meters
Bridge Area = 1,188 Sq. Meters

BRIDGE A6148 RTE. 249 SBL OVER RAILROAD
Bridge Length = 77.3 Meters
Bridge Width = 12.22 Meters
Bridge Area = 945 Sq. Meters

BRIDGE A6149 RAMP 3 OVER RTE. 249 SBL AND RAILROAD
Bridge Length = 449.3 Meters
Bridge Width = 8.62 Meters
Bridge Area = 3,873 Sq. Meters

BRIDGE A6150 RAMP 4 OVER RAILROAD
Bridge Length = 83.3 Meters
Bridge Width = 8.62 Meters
Bridge Area = 718 Sq. Meters

BRIDGE A6165 RTE. 249 SBL OVER RTE. 171 EB
Bridge Length = 69.0 Meters
Bridge Width = 12.22 Meters
Bridge Area = 843 Sq. Meters

Total Bridge Length = 776.1 Meters
Total Bridge Area = 7,567 Sq. Meters

SHOW ON PLAT

A. North point (show by arrow). Plat to show stations from left to right. Do not put survey centerline in middle of sheet.
B. Course of stream far enough above and below bridge site to show flood condition - minimum 1,000' each way. Meander of stream should be accurately surveyed.
C. Direction of flow.
D. Angle stream makes with center line proposed roadway, and proposed skew angle.
E. Location of existing and proposed roads, and the stationing on proposed road.
F. Location of present bridge with general dimensions of same.
G. Location of proposed bridge giving station of proposed center of main span.
H. Location and description of any features which influence the course of the stream above and below the site, near enough to affect layout for bridge.
I. Recommended change of channel. Make survey of this and submit profile of same.
J. Small sketch of four sections showing approximate course of stream and road, and location of proposed bridge.
K. Location, elevation and description of two permanent bench marks.
L. Fences, buildings, etc. also reference points and ties on each side of stream.
M. Name of stream State whether it is a river, creek, drainage ditch, rocky or dry run, etc.
N. Location of valley section (see "b" contracted profile).

(4 SECTIONS) INDEX MAP

Revised Bridge Layout - After Practical Design

Name of Stream ALL BRIDGES OVER:
71 BUS., RTE. 249, R.R., MINE BRANCH

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
REPORT OF BRIDGE SURVEY

SEC. 20 T. 28 R. 32
ROUTE 249 ; JASPER COUNTY
SURVEY MADE BY R. PRESLEY 98
PREPARED BY JERRY BRADLEY / HNTB
Project Manager
CHECKED BY RICHARD WALTER / HNTB
Transportation Project Manager
PROJ. NO. STA.
JOB NO. J7U0436I BRIDGE NO.

$FILE$ $TIME$ $DATE$

REV. 2-26-99

Construction Cost Estimates: Original vs. Revised Alternatives

ORIGINAL ALTERNATIVE:

BRIDGES:

Br. A6140	Orig. Est.=	$3,995,817
Br. A6148	Orig. Est.=	$2,832,442
Br. A6149	Orig. Est.=	$11,312,387
Br. A6150	Orig. Est.=	$2,565,313
Br. A6165	Orig. Est.=	$2,026,580

ROCK LINING:

Relocated Mine Branch Rock Lining = $357,755

TOTAL = $23,090,294

REVISED ALTERNATIVE:

BRIDGES:

Br. A6140	Estimate =	$2,326,133
Br. A6148	Estimate =	$1,032,018
Br. A6149	Estimate =	$7,875,718
Br. A6150	Estimate =	$1,093,132
Br. A6165	Estimate =	$1,814,860

ROCK LINING:

Relocated Mine Branch Rock Lining = $45,000

CULVERTS:

A7260 (Rte. 249 NBL and Ramp 3) =	$1,306,376
A7261 (Rte. 249 SBL) =	$783,929
A7261 (Ramp 4) =	$763,375

MSE WALLS:

A7265 MSE Wall at N. End Bt. =	$121,880
A7263 MSE Wall at N. End Bt. =	$137,360
A7264 MSE Wall at S. End Bt. =	$137,030

EMBANKMENT AND COMPACTING EMBANKMENT:

A6140 Embankment at N. End =	$80,360
A6140 Embankment at S. End =	$766,262
A6148 Embankment at N. End =	$62,916
A6148 Embankment at S. End =	$384,160
A6149 Embankment at S. End =	$869,946
A6149A Embankment at N. End =	$59,829
A6150 Embankment at S. End =	$462,560
A6165 Embankment at N. End =	$29,008
A6165 Embankment at S. End =	$27,244

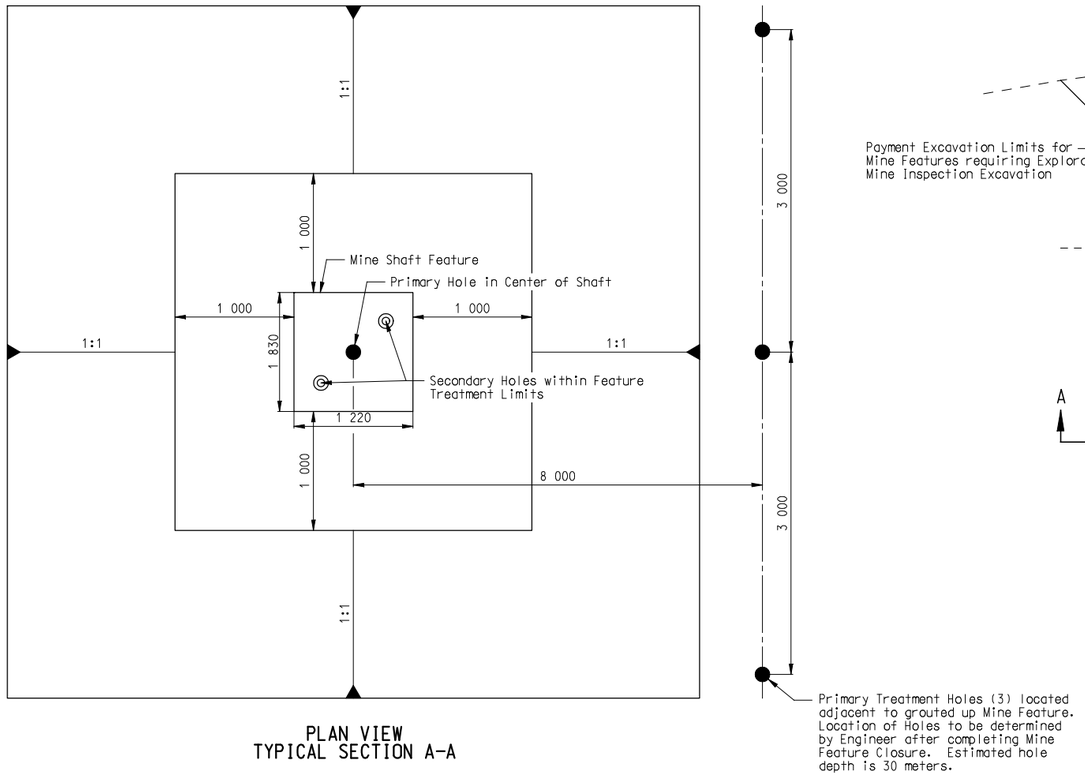
ADDITIONAL PAVEMENT:

A6140 =	$ 51,916
A6148 =	$ 56,422
A6150 =	$ 50,085
A6165 =	$ 38,037

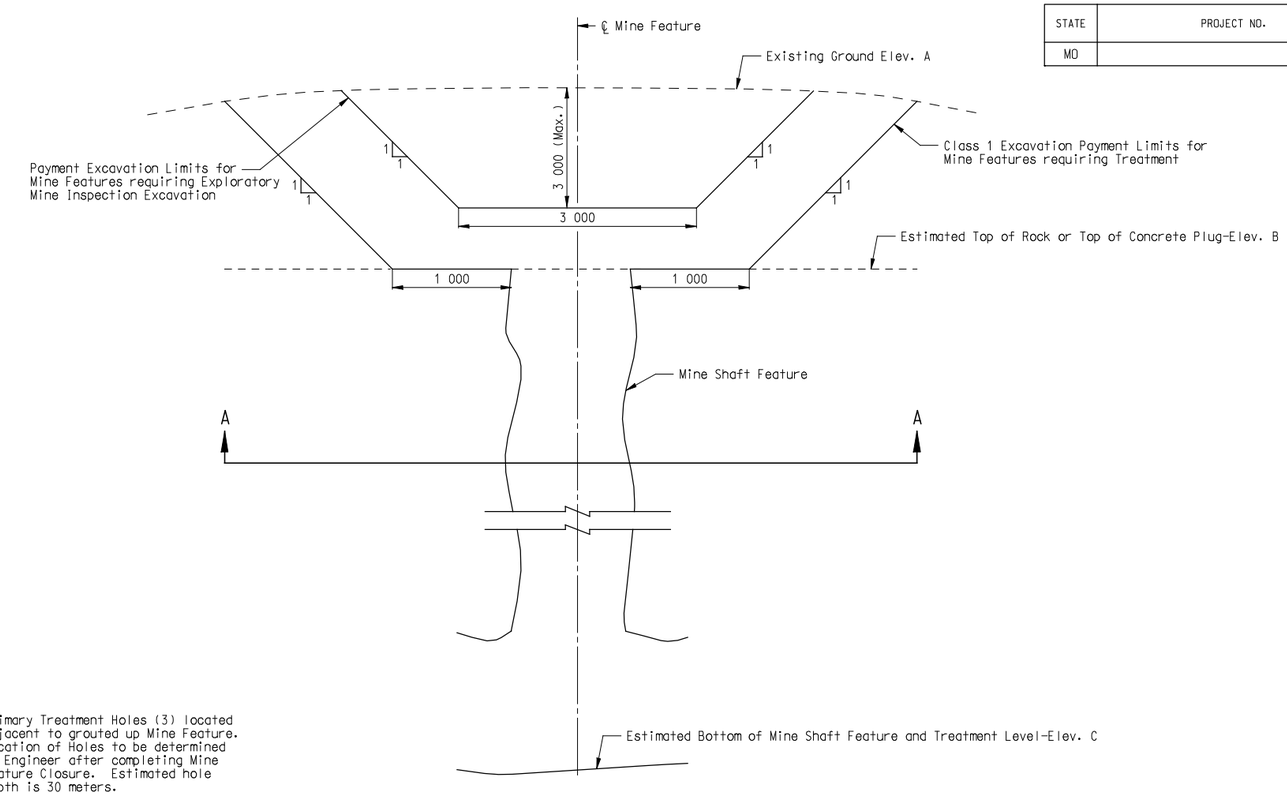
TOTAL = $20,375,556

TOTAL DIFFERENCE IN COST = $2,714,738

STATE	PROJECT NO.	SHEET NO.
MO		



PLAN VIEW
TYPICAL SECTION A-A



ELEVATION VIEW
TYPICAL SECTION

TYPE 1 CONFIRMED MINE SHAFT FEATURES REQUIRING CLOSURE

Shaft No.	Known Condition	Coordinates		Elevation			** Class 1 Excavation (cu. meter)	** Mine Shaft Closure Drilling - Primary and Secondary Holes (meter)	** Drilling and Casing of Overburden (meter)	** Drilling of Rock (meter)	** Redrilling of Hardened Grout (meter)	** Low Mobility Grout (cu. meter)
		Northing	Easting	A	B	C						
414	MDNR Closure	107717.480	855454.650	301.000	296.000	245.000	465	153.0	15.0	75.0	19.0	130
725	MDNR Closure	108076.090	855187.990	302.000	295.000	260.000	1075	105.0	21.0	69.0	18.0	95
521	Shaft Feature	108111.570	854916.640	302.000	295.000	260.000	1075	105.0	21.0	69.0	18.0	95
CS-4	Shaft Feature	108005.910	855244.830	299.000	291.000	270.000	1520	63.0	24.0	66.0	17.0	65
TN-1	Shaft Feature	108075.280	855101.700	292.000	286.000	260.000	725	78.0	18.0	72.0	18.0	75

** These quantities are included in the estimated quantities table on Sheet No./f03/.

TYPE 1 UNCONFIRMED MINE SHAFT FEATURES REQUIRING INVESTIGATION AND POSSIBLE CLOSURE

Shaft No.	Full Treatment Estimate	Coordinates		Elevation			Exploratory Mine Feature Inspection Excavation (cu. meter)	Class 1 Excavation (cu. meter)	Mine Shaft Closure Drilling - Primary and Secondary Holes (meter)	Drilling and Casing of Overburden (meter)	Drilling of Rock (meter)	Redrilling of Hardened Grout (meter)	Low Mobility Grout (cu. meter)
		Northing	Easting	A	B	C							
416	Yes	107754.540	855389.830	298.500	295.500	245.000	** 135	** 10	** 151.5	** 9.0	** 81.0	** 20.0	** 129
J-9	Yes	107885.000	855364.000	299.300	295.800	260.000	** 135	** 105	** 107.4	** 10.5	** 79.5	** 20.0	** 96
Ramp #3	No	108123.550	855152.980	300.800	294.800	260.000	** 135	590	104.4	18.0	72.0	18.0	94
6150	No	107828.900	855132.460	295.510	293.510	270.000	** 60	5	70.5	6.0	84.0	21.0	69
J-1	No	108133.000	855420.000	303.200	298.700	270.000	** 135	225	86.1	13.5	76.5	19.0	80
J-2	No	108147.000	855293.000	299.300	294.800	260.000	** 135	225	104.4	13.5	76.5	19.0	94
J-3	No	108160.000	855080.000	300.800	294.800	260.000	** 135	590	104.4	18.0	72.0	18.0	94
J-6	No	107765.000	855378.000	298.100	295.100	245.000	** 135	10	150.3	9.0	81.0	20.5	128
J-8	No	107773.000	855411.000	298.100	295.100	245.000	** 135	10	150.3	9.0	81.0	20.5	128
J-10	No	108066.000	855399.000	306.900	296.900	270.000	** 135	2615	80.7	30.0	60.0	15.0	76

** These quantities are included in the estimated quantities table on Sheet No./f03/.

Note:
Mine Shaft Closure Drilling depth measured from top of rock or top of concrete plug level.
Treatment hole drilling adjacent to mine feature measured from existing ground level.
Mine features 410A, 410B, CS-1, CS-2, CS-6, SS-1 and J-4 have been previously investigated and no indication of shaft feature identified. No treatment is planned.
Mine feature J-7 is located beneath the MO & NO. AR. RR tracks and no investigation or treatment is planned.
It is anticipated that the following shafts will not require closure: Ramp 3, 6150, J-1, J-2, J-3, J-6, J-8 and J-10. The quantities shown for these shafts are not included in the estimated quantities table on Sheet /f03/. These quantities are shown for the purpose of adjusting the plan quantities should Mine Shaft Closure (Type 1) be required at these locations.

Note:
For locations of Mine Shafts, see Sheet /f01/.

Construction Sequence

1. Perform excavation to expose mine shaft feature.
2. Drill and grout up mine shaft feature to top of rock.
3. Drill and grout primary treatment holes adjacent to grouted up mine shaft feature.
4. Backfill mine shaft feature excavation.

MINE SHAFT CLOSURE (TYPE 1)

USER: dknudsen
PLOTTED: 07-DEC-2007 13:22 k:\B33821\Plans\CombinedPackage_120505\FoundationPackage\f05.dgn

DETAILED AUG 2005
CHECKED AUG 2005
HNTB

NOTE: THIS DRAWING IS NOT TO SCALE, FOLLOW DIMENSIONS.

SHEET NO. OF

JASPER COUNTY

STATE	PROJECT NO.	SHEET NO.
MO	FAF-249-1(8)	41

FINAL PLAN

RTE. 171 (RTE. 71 BUS.)
EB RTE. 171
RTE. 249 SBL
RTE. 249 NBL
RELOCATED EAGLE ROAD
RAMP 3
RAMP 4
WALL A7265
WALL A7264
WALL A7263
BRIDGE A6165
BRIDGE A6149
BRIDGE A6150
BRIDGE A6148
BRIDGE A6140
CULVERT A7262
CULVERT A7261
CULVERT A7260
MISSOURI & NO. ARKANSAS RR
MINE BRANCH
Ramp #3
End Bent 1
Bent 2
Bent 3
Bent 4
Bent 5
Bent 6
Bent 7
Bent 8
End Bent 3
End Bent 4
End Bent 9
J-1
J-2
J-3
J-4
J-5
J-6
J-7
J-8
J-9
J-10
SS-1
CS-1
CS-2
CS-3
CS-4
CS-5
CS-6
CS-10
CS-11
CS-12
CS-13
CS-14
CS-15
TN-1
725
521
6150
410A
410B
416
414

LEGEND

- Type 1 Mine Feature, Found and Closed
- Type 2 Mine Feature, Found and Closed
- Mine Feature, Found, Not Closed
- Mine Feature, Not Found (Design Phase)
- Mine Feature, Not Found (Construction Phase)

Slope Limits, work performed under Job No. J7U0436I

MINE FEATURE AND STRUCTURE LOCATION

JASPER COUNTY

DETAILED FEB 2007
CHECKED FEB 2007
HNTB

NOTE: THIS DRAWING IS NOT TO SCALE, FOLLOW DIMENSIONS.

SHEET NO. OF

USER: spreston
PLOTTED: 03-MAY-2007 16:42
G:\42500Rt249_Construction\drawings\AsDrilledPlans\m41.dgn

Photo 1 – Before Condition
Route 249 – Typical abandoned mine site. Historic dumping, chat piles and open mine shaft.

Photo 2 – Before Condition
Route 249 – Typical water filled mine shaft.

Photo 3 – Before Condition
Route 249 – Before construction photo of open mine shaft (timber cribbing shown).

Photo 4 – Construction
Route 249 – Aerial photo of construction site.

Photo 5 – Construction
Route 249 – Performing ground treatments under box culverts.

Photo 6 – Construction
Route 249 – Installation of permanent casing for micro-piles

Photo 7 – Construction
Route 249 – Random sinkholes occurred during construction of foundation units.

Photo 8 – Construction
Route 249 – Mechanically stabilized earth walls used to shorten bridge lengths.

Photo 9 – Construction
Route 249 – As-built interchange in EPA Superfund/Abandoned mine site.

Photo 10 – Construction
Route 249 – As-built photo of Bridge Nos. A6149 and A6148.

Photo 11 – Construction
Route 249 – As-built photo of Bridge No. A6148.